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Organizing Application Support in a Multisite Organization

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Insinöörintyössä selvitetään, millä tavoin tulisi järjestää erään suomalaisen IT-yrityksen sovellustuki kattamaan useilla aikavyöhykkeillä olevien asiakkaiden ja käyttäjien tarpeet. Näkökulmana on IT-palvelun kehittäminen ihmislähtöisellä tavalla. Työssä tarkastellaan sovellustuen merkitystä palveluna. Yritysten välinen B2B-tuki pyritään erottamaan kuluttajille suuntautuvasta tuesta, koska näiden sovellustukien tarjoama arvonlisäys on erilainen, mikä tulee ottaa huomioon palvelun kehittämisessä. B2B-tuki nähdään palveluna, joka kuuluu yrityksen liiketoiminnan kannalta tärkeään asiakkaiden tyytyväisyyttä ylläpitävään kategoriaan.

Työn raameina toimivat ITIL Service Operation -käytänteet sekä tieteelliset selvitykset IT-palvelujen ulkoistamisen haasteista ja eduista. ITIL-raamin mukaisesti työssä pohditaan tukifunktion toimintamallia. Eri *service desk* -mallien pohdinnan kautta haetaan kehitystyön kohteena olevalle yritykselle parasta mallia. Ulkoistamisnäkökulma on otettu mukaan, jotta voidaan pohtia työvoiman ja palvelun merkityksen välistä suhdetta.

Insinöörityötä varten suoritettiin pienimuotoinen tutkimus, jossa kerättiin tietoa muutaman PK-yrityksen tukifunktion järjestämismalleista. Tutkimus toimii kuvauksena sille, miten käytännön toteutuksia on tehty. Tutkimuksella ei kateta kaikkia malleja, vaan selvitetään erityisesti sitä, miten kattavuuteen on pyritty ja millaisia henkilöstöillä.

Kehityskohteena olevan IT-yrityksen kuvauksessa keskitytään nykyisen tukitiimin tehtäviin ja toimenkuvaan. Kartoituksella pyritään selvittämään, mitä tukitiimin tehtäviä kattavampi sovellustuki tulisi sisältämään. Lisäksi avataan ko. sovelluksen toimintaa siltä osin, kuin se on merkittävää tukitiimin paikallaolon suhteen: sovelluksen rotaatiossa vaihtelevat päivittyminen ja laskenta-ajot, käyttäjien sovelluksenkäyttöaika sekä hiljainen aika ilman merkittäviä ajoja tai käyttöä.

Insinöörityön perusteella IT-yritystä suositellaan ottamaan käyttöön *follow-the-sun* -toimintamalli sisäisillä resursseilla. Jatkona suositellaan ITIL:n mukaista toimintaa palvelun kehittämiseksi.

Avainsanat	sovellustuki, ITIL Service Operations, B2B, follow-the-sun

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This report addresses the question of how a software company should organize its application support when there are stakeholders across many time zones. The starting point of this study is evaluating the service that application support provides. This report separates business-to-business (B2B) support from business-to-consumer support by claiming that the value created by B2B-support is of essence and should be taken into account when developing the service. This report puts B2B-support to category *important* on the sphere of customer satisfaction.

From relevant research, this report gathers best practices and documented experiences to determine the most suitable solution for the case company with an application support function development need. On top of that, this report discusses ways to organize and source application support based on ITIL Service Operations and relevant research on insourcing and outsourcing.

Through a set of case studies, real-life models are researched and illustrated. The case studies do not cover all possible models but act as a modelling of possible solutions and a basis upon which the impacts of those solutions can be reflected.

The case company is presented briefly with a more detailed description of the company's support team. The many tasks of the support team are discussed in order to understand whether all of them should be covered in the recommended operations model. Moreover, the application's daily rotation is described because this report finds that it is relevant when considering the application support's coverage need.

Finally, this report concludes that the recommended operations model for the case company is *follow-the-sun* with a virtual service desk and insourced staff. This report further recommends that the case company should implement ITIL's best practices for Continual Service Improvement (CSI) and formulate a Service Improvement Programme (SIP).

Keywords	application support, service desk, B2B, ITIL Service Operations, follow-the-sun

Contents

List of Abbreviations

APAC	Asia Pacific and Japan, operational business region
B2B	Business-to-business
B2C	Business-to-consumer
EMEA	Europe, Middle East and Africa, operational business region
FCR	First Contact Resolution
FTS	Follow the sun
ITIL	Information Technology Infrastructure Library.
ITSM	Information Technology Service Management.
SCM	Supply chain management
UTC	Coordinated Universal Time

1 Introduction

This report addresses the question of how a software company should organize its application support when there are stakeholders across many time zones. Thus, the study starts from evaluating the application support service and the value that this service brings to customers and the company's business.

The case company in this study is a Helsinki based Finnish company that has been in supply chain management (SCM) business for 11 years. Its software product is an integrated supply chain planning solution. The business model is in most cases Software as a Service (SaaS) with some on-premise installations implemented and supported.

The company's SCM solution has been sold to other markets outside Finland: Sweden, Norway, Denmark, Germany, Great Britain, South Africa, Italy, Spain, France and USA. The solution has at the moment users is almost 20 countries over many time zones and cultures. The company has presence *i.e.* offices with sales and project management personnel in all markets where its solution is used. Because of this, providing software support to the customers as well as support for technical implementation teams in various time zones has grown to be an issue.

Therefore, by exploring relevant research, this report gathers best practices and documented experiences to find out the most suitable solution for the case company. In addition, this report discusses ways to organize and source application support based on ITIL Service Operations and relevant research on insourcing and outsourcing.

Through a set of case studies, real-life models are researched and illustrated. The case studies do not cover all possible models but act as a modelling of possible solutions and a basis upon which the impacts of those solutions can be reflected.

The many tasks of the support team are discussed in order to understand whether all of them should be covered in the recommended operations model. Moreover, the application's daily rotation is described because this report finds that it is relevant when considering the application support's coverage need.

Finally, this report concludes with the recommended operations model and sourcing, as well as next steps that the case company should take in developing the application support service.

2 Software Application Support Service

This chapter sets a wider framework to the report and aims at putting software application support to its correct place in building customer satisfaction. This chapter also defines the importance of separating business-to-business application support from business-to-customer application support, and the development issues related to that. Finally, this chapter looks into what a global setting of an organization means to the application support service.

2.1 Application Support as Part of Customer's End-to-End Journey

In information and communication technology today, successful business is defined by its revenue but also customer and employee satisfaction. In surveys, customer satisfaction is often looked at from the point of view of one service event although the whole end-to-end journey of a customer should be considered. Research has shown that the benefits of well-managed customer experience are extensible: customer satisfaction grows stronger, loss of customers to another company is reduced, revenue increases and employees are more satisfied with their roles. Moreover, the employees work more collaboratively across functions and levels, which benefits the whole company. (Rawson, Duncan, & Jones, 2013)

When a company aims for continuous service, it aims for customer satisfaction. According to case studies, customer satisfaction comes from cumulative experiences the customer gathers from multiple touchpoints and channels over time. In other words, it is the customer journey that matters. (Rawson et al., 2013) Regardless of the industry, one part of the customer journey is the customer support they receive: customer-support service is included in offerings and is something that majority of customers experience. A traditional take on customer-support is that it is an addition to the core service. However, for companies, core actions and support are separated units. Also customers have been studied to separate the problems of support from the problems of core service; in fact, poor contacts with support are perceived as more problematic than actual issues of the core. (Roos & Edvardsson, 2008)

As the focus of this report is to improve support, the thought of customer's end-to-end journey should be kept in mind. Research has shown that measuring customer satisfaction by single transactions does not reveal the whole truth about customer satisfaction. (Rawson et al., 2013) In IT businesses the focus is usually in the single transactions and the best practices also start from the speedy and accurate resolution on support requests (ITIL Service Operation, 2011). Putting this opposite recent studies, this report is attempting to get to a reasonable conclusion about how to arrange application support in global software company when taking customer satisfaction and employee satisfaction into consideration. In other words, there will a strong focus on people in this report while also reflecting upon Information Technology Infrastructure Library (ITIL) and other relevant research.

2.2 Characteristics of B2B Application Support

An additional relevant issue from the point of view of this report is the separation of business-to-business (B2B) support from business-to-consumer (B2C) support. This report is concerned with B2B support, where customer is a top priority. The difference between B2B and B2C support lies in complexity of issues, personal relationship with customer, number of contact persons, collaborative focus and marketing value of the support service. (Johnsson, 2016)

In software B2B industry, the issues that are reported to the support function are complex and require research and testing for the right solution to be found (Johnsson, 2016). In comparison to B2C support, the resolution in the first contact (First Contact Resolution, FCR) is oftentimes not a metric that gives the most value to the customer or the company. Instead, collaborative customer service solutions where an application support team member has searched for the best solution, are solutions that result in satisfied customers and efficiency in the whole business. This stems from the complexity of the products and the issues. (Johnsson, 2015)

In B2B support cases, customers are considered to be friends. The relationship with the client is personal. Also, support knows the client's business and history with the company. In this respect, collaborative customer support brings the best results. For B2B support, the concept of customer also means many contacts towards the customer, which requires updated information about the client side personnel involved with the

supported product. Finally, in B2B application support, good service translates into good marketing for the product and company. (Johnsson, 2016)

There is furthermore a clear difference in the support work of B2B versus B2C. Where B2C support promotes FCR and quick escalation or redirecting of requests, B2B support is characterized by deeper knowledge, longer overall resolution times and strong ownership on the cases. (Johnsson, 2015) This translates to a different skill set needed for succeeding and enjoying the B2B support than B2C support, but also to a focus on *value* delivered to the support customer; this value in B2B support is of different nature than in B2C as whole business processes and success may depend on the B2B support (Salomonson, Åberg, & Allwood, 2012).

It can in fact be argued that B2B application support adds *more* value to the customer in the instances where the FCR is not met (Johnsson, 2015). Taking this back to the end-to-end journey of the customer, and the customer satisfaction this report is interested in (Rawson et al., 2013), B2B support should be developed to a direction where the B2B personnel can dedicate their time to single requests making the application support service a clearly value adding function to both the customer and the organization. In practice, emphasis should be on dedication, not speed.

When developing the application support service in B2B model, the above-mentioned aspects need to be considered so that THE application support service is able to live by those characteristics. Furthermore, six factors should be considered when troubleshooting for shortcomings in the application support:

- accessibility
- responsiveness
- knowledge
- professionalism
- resolution
- customer satisfaction.

(Johnsson, 2015)

Accessibility means the contacting of service representative and how simple that is. With *responsiveness* is meant the level of activity of the support team in reacting to the

customers contacting them. *Knowledge* refers to the level of expertise of the support team. *Professionalism* means the interaction with the customer as well as the attitude towards the work. With *resolution* the question is how fast and how often the support team resolves the issues fully. Finally, *Customer Satisfaction* refers to the experience the customers have with the support team. (Johnson, 2015)

2.3 Multisite Organization from Application Support's Perspective

This report discusses organizing application support in a multisite organization. Multisite organization means that there is a global presence in the form of distributed country offices and company employees around the globe. Although global presence is clearly an advantage for a company's global business ambitions, distances and cultural differences can also pose challenges.

The advantages of a spread-out setting include the ability to provide services all around the clock. In a global business, this is mandatory. In software development for example, the development cycle time can be diminished by utilizing 24-hour-available team spread out all over the globe (Czekster et al., 2011). This is true also with support function where the overall time to resolve a longer case can be reduced by implementing a 24-hour service through dividing the support team to various time zones.

The challenges provided by distance are in essence the same for the support function as they are for any project activity since communication and coordination are very likely to be major issues. Communication is challenged by the distance in a multisite organization, and communication needs to be on-going as coordination of activities requires this. (Damian & Zowghi, 2002) Generally, the lack of face-to-face communication contributes to misinterpretations and lowered situational awareness, which in their turn make teams and managers anxious and cause delays in multisite organizations (Wongthongtham & Kasisopha, 2011)

2.4 Global Support Team

A support team spread out to country offices – a multisite or global support team – as a working arrangement possesses naturally many challenges comparable to a global development team. As researches found out in the report "The impact of stakeholders'

geographical distribution on managing requirements in a multisite organization", major problems arise in communication and coordination. Multisite organizations face these challenges in many functions: communication between different functions has been studied, and intra-function challenges have also gotten some attention especially in the context of software development (Damian & Zowghi, 2002). For the purposes of this thesis, the research done on multisite organizations is generally interesting as challenges overlap.

The challenges of coordination focus on hand-off or hand-over processes related to the so-called Follow-the-sun (FTS) workflow model (see more in chapters 2.1.3 and 2.3.1). It is commonly known that any knowledge handovers require good communication for there to be any considerable value added to the process. The handovers are pinpointed as the difficult area in many FTS related studies (see *e.g.* Carmel, Espinosa, & Dubinsky, 2010; Czekster et al., 2011; Damian & Zowghi, 2002; Visser & Van Solingen, 2009). While the FTS process followed by many functions in multisite organizations does give positive results in time cycles, the handover issues have often proved to be too severe to overcome resulting in the abandonment of the FTS model at least in software development environments. (Czekster et al., 2011) The challenges of handovers should be considered a risk to be carefully managed also for global application support teams.

2.5 Conclusions of Application Support Service Chapter

This chapter has aimed at setting a wider framework upon which the development of application support service can be reflected. To begin with, customer satisfaction is the foundation for any customer support service. The satisfaction should not, however, be measured in single contact events with *e.g.* service desk but as the whole end-to-end journey including also other service events such as service design and service implementation.

Secondly, application support service in the business-to-business sector is observed to be different from business-to-consumer. This difference needs to be reflected on through the expectations towards service desk tasks and personnel. In B2B, customer gets a significant value addition when a service request gets handled with precision and a genuine fix rather than speed and quick-fix.

Finally, the global setting has its relevance to the application support function. Multisite organizations do encounter challenges caused by distance, but there are also considerable advantages to be taken into use. A global support team is in theory a good response to global customers, and with the use of internet, customer service can function with 24-hour coverage. However, the challenges of cooperation and communication have to be addressed and there needs to be a good process to overcome the difficulties.

3 Organizing Application Support Operations

To discuss how to organize the application support operations in a multisite organization, there needs to be a framework of best practices. This report utilizes the Information Technology Infrastructure Library (ITIL) framework. In this chapter, application support is first examined through the ITIL perspective. Then, various ways to set up the resources are studied. Lastly, application support operation models are described. In practice, this chapter serves as the background for the choice of service desk, service sourcing and operation model.

3.1 ITIL Service Operation

Information Technology Infrastructure Library (ITIL) is a set of best practices to do IT service management (ITSM). It gives wide range of guidance to service providers. Although it is not a standard, it is widely accepted and recognized. ITIL framework consists of five service lifecycle parts, and this report is based on one of those: ITIL Service Operation. It is a best-practice guide for the service operation part on lifecycles. (*ITIL Service Operation, 2011, p. 3*)

3.1.1 Customer Support in ITIL

ITIL Service Operation addresses the question of customer support. Organizing application support as such is not a case that has best practices documented in ITIL; it is mentioned as an activity that could be performed by one or many departments (*ITIL Service Operation, 2011, p. 153)*. Implementation of a service desk is however something ITIL addresses: ITIL recommends service desk as part of customer support service. Service desk operates as single point of contacts for users, and is a point of communication as well as point of coordination for IT processes. (*ITIL Service Operation, 2011, p. 156-157*)

In effect, the best practice ITIL gives for organizing IT support is service desk. It is the preferred solution from the customer perspective as it increases accessibility and communication which leads to improved customer satisfaction. According to ITIL, user requests get handled fast in a service desk model, and teamwork and internal communication are affected in a positive way. (*ITIL Service Operation, 2011, p. 157*)

3.1.2 Service Desks of ITIL

Service desks construct a function that can have large variety in size and location. ITIL states that the solution must be based on the organization. (*ITIL Service Operation, 2011, p. 158*)

Some common ways to organize service desk are

- local service desk
- centralized service desk
- virtual service desk
- specialized service desk groups; and
- follow the sun.

In practice, the business needs of an organization may require that the solution is a combination of the above. (*ITIL Service Operation, 2011, p. 158-161*)

Local service desk is commonly seen as an inefficient and expensive form of service desk. Some reasons for having a local service desk nevertheless include cultural and political reasons, time zones and highly specialized services. The number of service desks is high in the local service desk model. **Centralized service des**k has the advantage of efficiency and cost-effectiveness over local service desk: the staff is located in one or some centralized service desks. The benefits of centralized service desk also include high skill levels of staff that is achieved through better familiarization. (*ITIL Service Operation, 2011, p. 158-159*)

Virtual service desk brings the use of internet to the service desk organization: the staff can be sitting anywhere on the globe while the impression to the outside is that there is one centralized service desk. Virtual service desk makes outsourcing (see Chapter 3.2) as well as work from home possible. The risks include quality problems in the form of inconsistency and un-uniformity. (*ITIL Service Operation, 2011, p. 160*)

Specialized service desk groups serve their place in organizations where incidents need to go straight to a specialist. Incidents get resolved fast. Specialized service desk should according to ITIL only be used for selected key services to reduce complicating the support service and to keep the number of service requests tolerable. (*ITIL Service Operation, 2011, p. 161-162*)

Follow the sun (FTS) service desk is of key interest to this report and is looked at in more detail also later (see Chapter 3.4). Follow-the-sun allows an international organization to tie “geographically dispersed service desks” together to form a support service that continues 24 hours a day. In effect, when one service desk in Asia-Pacific closes at the end of the working day, another service desk in Europe opens and continues with the incidents. Open incidents are handed over and the responsibility is carried forward in the European desk until the service desk in the American time zones opens. The incident is again handed over and carried in the American desk until Asia-Pacific service desk opens and the cycle is complete. (*ITIL Service Operation, 2011, p. 161*)

3.2 Sourcing Application Support

Application support is a form of customer service. For the purposes of this report, the service sourcing factor is looked at as either locally provided, externally provided or some combination thereof. These three varieties will be referred to as insourced service, outsourced service and co-sourced service. Choice of sourcing is a strategic decision, and for the purposes of this report it is relevant to think about the effects of service sourcing choices from the perspective of customer support service quality.

3.2.1 Insourcing

With insourcing this report means that the service is provided from inside the firm; in the context of this study, the resources for providing application support services are taken from inside the firm. In some contexts insourcing means opening operations in foreign countries (Buderi, 2004). In the IT sector, insourcing is defined as “the organizational arrangement that a firm relies on internal IT department to obtain IT services” (Qu, Oh, & Pinsonneault, 2010). ITIL defines insourcing similarly in its glossary as “using an internal service provider to manage IT services”. (ITIL Service Operation, 2011, 327)

Insourcing in terms of support functionality has the same characteristics as IT insourcing in general. In insourcing, knowledge sharing between IT and business units is more intense and coordination is smoother due to better coordination mechanisms such as

routine meetings and shared location (Qu et al., 2010). When the quality of customer services is in question, the importance of this advantage is high.

In the article *The strategic value of IT insourcing: An IT-enabled business process perspective* (Qu et al., 2010) the authors discuss the impact of types of innovations underlying business processes on IT insourcing and outsourcing. It is stated that depending on the type of innovation, advantages of IT insourcing are more profound in some cases than others. Generally, the more important the innovation is to the core of the business, the more the business will benefit from IT insourcing due to the advantages of coordination mechanisms. (Qu et al., 2010)

Insourcing, naturally, means that the internal resources need to be valid and sufficient. In practice this translates to human resources *i.e.* planning of organizational staffing.

3.2.2 Outsourcing

Outsourcing is a phenomenon widely researched and documented. Its risks and challenges are well documented and also its benefits have been measured and reported also in the field of application support or customer support in general (Raiborn, Butler, & Massoud, 2009; Wuyts, Rindfleisch, & Citrin, 2015).

Service outsourcing means selecting the service operator through strategic partnership or competitive tender bidding (Stewart H.C. & Yuk-Hee, 2008). Especially service desk is often outsourced to minimize costs and maximize competitiveness. The reputation of outsourced application support is not totally positive as outsourcing of customer support leads notoriously to reducing in motivation to fulfill customer needs. (Wuyts et al., 2015) The best results require that service management practices are implemented before outsourcing actions. Also, both the customer organization and the external service provider need to remain engaged at all times. The ITIL framework provides some key point for consideration when outsourcing is being considered. (ITIL *Service Operation, 2011, p. 154*)

In many cases, application support service outsourcing has however been perceived as an important component in servicing global markets and satisfying customers. Outsourcing in practice means using an outside vendor to perform the application support service's functions. The vendor may be located anywhere in the world. One

strategy of firms looking to outsource has also been to spin-off organizational units as new support service firms. (Raiborn et al., 2009) This can be perceived as blended co-sourcing, and will be considered more in detail in the next chapter.

Outsourcing can be highly beneficial for the outsourcing firm. Risks of outsourcing have to do with hidden costs and unexpected events which can lead to uncontrolled situations and major financial costs. Generally, risks of outsourcing are well recognized and manageable with appropriate approaches. (Raiborn et al., 2009) It is furthermore notable that the service outsourcing model needs annual reassessment and yearly renewal. Also competitive tender bidding should be noted as one process that stems from outsourcing. (Stewart H.C. & Yuk-Hee, 2008)

In the last decade, many non-IT-firms did however abandon outsourcing and opted again for insourcing. This was a trend among many big-league firms such as JP Morgan, Sainsbury and Deutsche Post. Reasons for terminations of outsourcing contracts vary, but there has been a link noticed between firm performance and outsourcing meaning that outsourcing was not beneficial for the performance of firms. (Qu et al., 2010)

3.2.3 Co-sourcing

Co-sourcing means a combination of insourcing and outsourcing. Some part or parts of a service are outsourced while others are fulfilled from within the company. A call-center type service desk, for example, can choose to answer some calls in-house and route some rush-hour calls to a vendor they are buying service from. In a call center, the pressing issue is the staffing and the varying number of calls. (Kocaga, Armony, & Ward, 2015) In a business case like in this report where requests mostly come by email and the number of requests is somewhat stabile, co-sourcing could mean outsourcing some hours of day to service desk vendor whilst doing some hours in-house.

Basically, co-sourcing is outsourcing to-a-degree. The amount of outsourcing depends on the needs and resources of the firm and the vendor. In the co-sourcing scenario, outsourcing can be targeted to a variety of functions: whole functions, *e. g.* 1st tier of support, could be outsourced fully *i.e.* performed by an external vendor in their premises, or both the insourced and outsourced services could be conducted in the same workplace. What dictates the solution are the needs of the outsourcing firm. One example of a kind of co-sourcing is spinning off an organizational unit into new firms,

which then provide the services for the original firms. In some cases, firms have sold whole functions to vendors, who then employ the selling firms' staff to do the same work they did for their previous employer. (Raiborn et al., 2009) These last scenarios may be good risk management and financial decisions, but from the point-of-view of employee satisfaction, they are not satisfactory. Unhappy employees also translate to poorer customer service, which should always be avoided.

3.3 Comparison of Sourcing Types

To tie together the different types discussed above, ITIL Service Design has the following definitions for these:

- In-sourcing is the provision of a service using an organization's own assets and capabilities.
- Out-sourcing uses the resources of another organization to provide a well-defined proportion of service capabilities.
- Co-sourcing is a combination of the two, using several organizations working together to source key elements of service capabilities.
- Application Service Provision (on-demand software) provides an organization with access to shared computer-based services via a network.

The main conclusion is that the question of insourcing and outsourcing should always be carefully made with all stakeholders considered. Short-run cost savings should never be the reason to outsource (Raiborn et al., 2009). According to ITIL, the decision is to be made by senior managers (ITIL Service Operation, 2011, p.168).

Another observation as a conclusion of the service sourcing is that firms can benefit from IT outsourcing when they follow best practices, such as outsourcing only commoditized IT functions, and developing partnerships with IT vendors. However, studies typically evaluate IT outsourcing benefits by comparing manager satisfaction before and after the adoption of IT outsourcing. A direct comparison between IT outsourcing and insourcing in terms of performance impact has received limited attention. It is thus yet unclear

whether or not firms that rely on outsourcing will achieve better performance than firms that rely on IT insourcing. (Qu et al., 2010)

3.4 Follow-the-sun operation model

This report is interested in how to give customer support in an organization where the stake-holders are spread to several time-zones around the world: there are customers in many countries, and users in even greater number of countries; there are internal customers and colleagues also in several countries (see also Chapter 5). A logical conclusion is that application support should be answering to requests whenever users are using the software. A closer look is now taken to follow the sun operation model which is used to serve these kinds of setups.

In the article “"Follow the Sun" Workflow in Global Software Development” researches Carmel, Espinosa and Dubinsky define Follow the sun (FTS) operation as a “round-the-clock work rotation method aimed at reducing project duration, in which the knowledge product is owned and advanced by a production site and is then handed off at the end of each workday to the next production site several time zones west” (Carmel et al., 2010). In software development sphere, FTS means always handing off tasks from one site to the next thus achieving a 24-hour development cycle (Czekster et al., 2011). In application support function, the handover may as well only consider the fact that the watch duty is handed over to the next site.

From the point-of-view of ITIL service operation, FTS is a form of service desk. FTS requires that there are service desks spread to cover the time zones. Usually, three locations allow for the full coverage when they are strategically located to the three operational business regions of Europe, Middle East and Africa (EMEA), Americas and Asia Pacific and Japan (APAC) (see Figure 1).

Figure 1. Operational business regions Americas (dark blue), EMEA (green) and APAC (light blue).

The advantages of the FTS service model include high availability and quick response times as well as meeting service level agreement (SLA), which should translate to customer satisfaction from their part. Also, the risk of delayed incident management is reduced compared to service desks operating only within certain hours.

The costs of having 24-hour coverage are low in the FTS model, because support staff is working only normal hours (ITIL Service Operation, 2011, p. 161) Also, for the employees, this model enables normal work days with lowered risk for overtime in critical incidents.

The challenges are in communication and sharing information as well as in common processes, tools and culture (ITIL Service Operation, 2011, p. 161). As was discussed earlier in this report, communication and coordination pose a significant issue in a global team setting. This is true in the FTS model, too, where handovers of service requests require good coordination, which in turn requires good communication. In a scenario, where the service desks are located in different cultural environments, the communication may require careful thought and planning to be effective and to-the-point. The risks include not only miscommunication but also unnecessary double work and interpersonal issues resulting in lowered team spirit and work ethics.

3.5 Conclusions of Organizing Application Support Operations

This chapter has looked at best practices of organizing application support operations. The framework has been ITIL. In addition, the question of resourcing was looked at in order to validate benefits and disadvantages of insourcing, outsourcing and co-sourcing.

In ITIL, organizing application support effectively means implementing a service desk. This has multiple benefits from being a single point-of-contact to the many ways in which it can be realized. In a multisite organization, a virtual service desk is the most modern way to operate. The service desks are ideally not local or even centralized, but spread out and communicating via virtual service desk software.

The question of outsourcing or insourcing depends on the needs of the organization. The popular outsourcing alternative comes across in research as a reasonable alternative with a need for careful planning and assessment. The question then is mainly: what functions should be outsourced? There are clear benefits in insourcing, too, and one key finding of this report is that anything considered as important to the core of the firm should be insourced. B2B application support, as was observed in Chapter 2, should never be overlooked but kept very close to the core. The conclusion is then that B2B application support should not be outsourced due to its importance to the overall success of the business.

The operation model Follow-the-sun is widely used to implement services over many time zones. In this model, staff is located in all operational business regions. When one team stops to work on one business region, another one starts in the next business region resulting in a 24-hour cycle. The benefits are that the employees get normal work hours and the coverage is full. The risks include handovers of cases where communication must be excellent. Also, sharing knowledge and providing training is a challenge when operating in a global setting in the FTS model. The conclusion of this report is that to achieve 24-hour coverage, the FTS model is the most cost-effective, employee-friendly and customer-serving model.

4 Case Studies

For the purpose of this thesis, a small-scale case study was conducted to gather information about how the application support function is seen and arranged in other SME software companies operating in similar business cases. Based on interviews within the case companies' application support personnel, usually the support manager, a view of the operations model was formed, and this was put into a simple illustration model to make a comparison of the cases visual.

The contact points were searched for via companies' web sites or through personal contacts. None of the companies or interviewed people will be named as this report aims for more general modelling. The purpose is to describe some real-world solutions that are in use.

To perform the interviews, the following set of questions was prepared:

1. How has your company organized application support?
2. Why did you choose this particular operations model?
3. Were other options considered?
4. Has the operations model gotten further development?
5. Has there been another model in use previously?
6. How are you going to develop application support, and what factors contribute to the development need?
7. What is good about the current model? Are there weaknesses?
8. How many people are there in the support team?

The interviews were conducted orally with the questions sent per email beforehand, and models were discussed also freely outside the questions. Especially ticketing software was a point that was discussed in interviews where applicable.

The answers were put into similar models with emphasis on support hours and amount of staff. To make time zone relevance clear, all times are converted to UTC.

4.1 Case 1: Centralized Service Desk, Insourcing

Company A is a supply-chain software company. It has customers mainly in EMEA business region with new business cases opening in Americas' time zone and future potential in APAC zones. Currently application support is centralized in Helsinki and insourced. Support requests come per email into a virtual service desk, which also enables remote work. Support is given in multiple languages: English, Finnish, Swedish and German.

Application support covers hours 6.00 – 15.00 UTC+0:00. To cover also for the new business cases in USA, working hours have been stretched to cover Americas time zones with the following method: one person is doing a long 10-hour evening shift 12.00 – 22.00 UTC+0:00 from the Helsinki office to assist personnel located in the Americas time zone. This support does not cover application support for customers currently because no customer is in support phase at the time of writing this report.

Figure 2 illustrates how there is no coverage for APAC time zones. Also, Americas are not extensively covered. Effectively, support is only present during EMEA working hours.

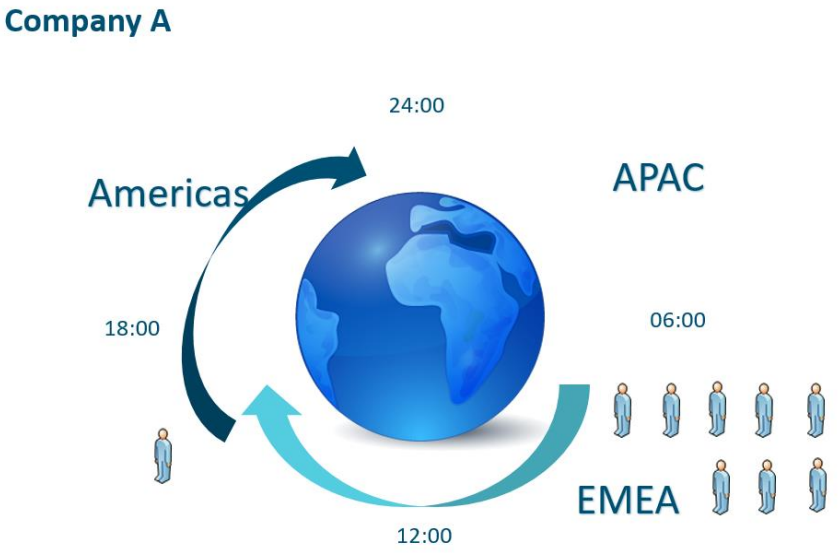

Figure 2. Illustration of Company A's application support coverage

The model is that of *centralized service desk*. All resources are in-house meaning this is an insourced model. The benefits are knowledge sharing and easy communication. The challenges come from stakeholder's geographical distribution which cannot be covered with this setting. Also, the employees need to stretch their work time occasionally to cover for the lacking hours in cases of serious incidents.

4.2 Case 2: Virtual Service Desk, Co-sourcing

Company B is a supply chain planning solution provider. It has clients in all business operation regions. The application support covers all time zones, as shown in Figure 3. Support requests are logged into a virtual service desk all around the clock by customers. Support is given in English.

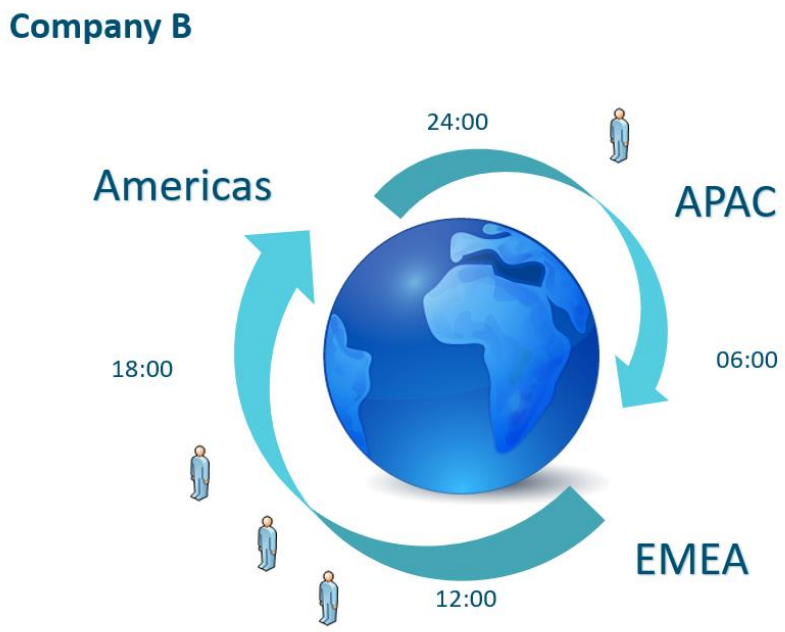

Figure 3. Illustration of Company B's application support coverage

In practice, the model is that APAC business region is covered with an outsourced service provided from within local customer's office. EMEA and Americas are covered from the United Kingdom by three insourced application support team members. They

cover the normal working hours with additional phone coverage hours before and after office hours. The phone cover stretches to 1 am local time.

The advantage is that the coverage is quite good. It is not full 24 hours but described as 18 hours, which is sufficient for the current customers. The challenges seem to be in the work load of the support staff: they need to work long days and give phone cover outside normal office hours. In the interview, this was not mentioned as an issue, but in general working long hours may be a risk for the employee's work satisfaction. Also the sole person in the APAC business region is subject to dissatiscation due to isolation and loneliness. There have in fact been challenges in keeping a person committed to the application support role.

4.3 Case 3: Follow-the-sun Model, Co-sourcing

Company C is an enterprise content management (ECM) solution provider. It has clients in all business regions. Company C uses follow-the-sun operations model with virtualized service desk and three service desk locations: Finland, USA and India. The model is a form of co-sourcing: Finland and USA operators are insourced whereas India operators are employees of a subcontractor.

For company C, application support service is defined as second level support. First level support is given by retailers of the software all around the world in local languages. Second level support arranged from within the company is given in English and Finnish due to the origins of the company. Third level support is given only from Finland, because the know-how about the company's product is strongest in the Finland office, where also product development takes place.

In Finland, there are about 20 employees in the application support; In the USA, the head count is about 10, and in India there are about 5 people performing the function as illustrated in Figure 4. The Indian team covers also weekends.

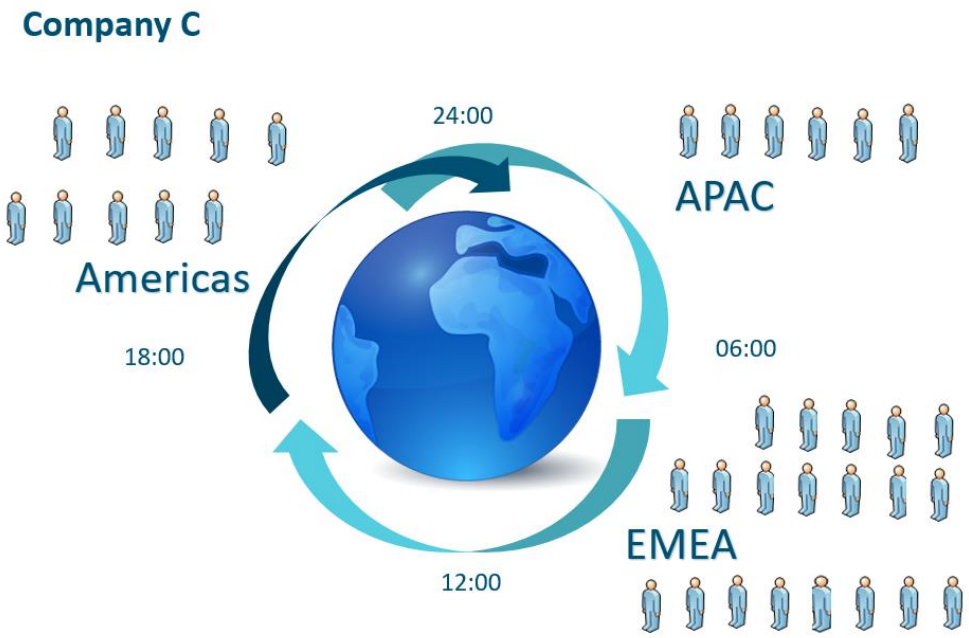

Figure 4. Illustration of Company C's application support coverage

Advantages of the system are high coverage at low costs. Challenges include keeping the global team's knowledge level up-to-date in all locations. The advantage of this model is the employees normal work days. The teams have dedicated supervisors who manage the workflow in handover situations. Handovers are not frequent but do happen: the support cases are prioritized and handovers are done accordingly.

The locations chosen for the FTS model implicate that the APAC zone team needs to stretch to give coverage between the Americas and EMEA business operations region. India's time zone is UTC+5:30 making it 3,5 hours ahead of the Finland office. Although the working hours were not covered in the interview, there is likely a setup where the outsourced staff need to work in less optimal hours. Also, as mentioned, they also cover weekends.

4.4 Case 4: Centralized Service Desk

Company D is a warehouse management system (WMS) provider. It has customers only in Finland. The WMS product of the company requires 24/7 support because of its business criticality and night time usage in the warehouses. Application support is given

in Finnish and all around the clock via phone coverage. Also, email requests are known but those are handled commonly by the service manager.

The model covers all hours of the day by 24-hour-shifts handled by one person. The shift starts at 7 am.

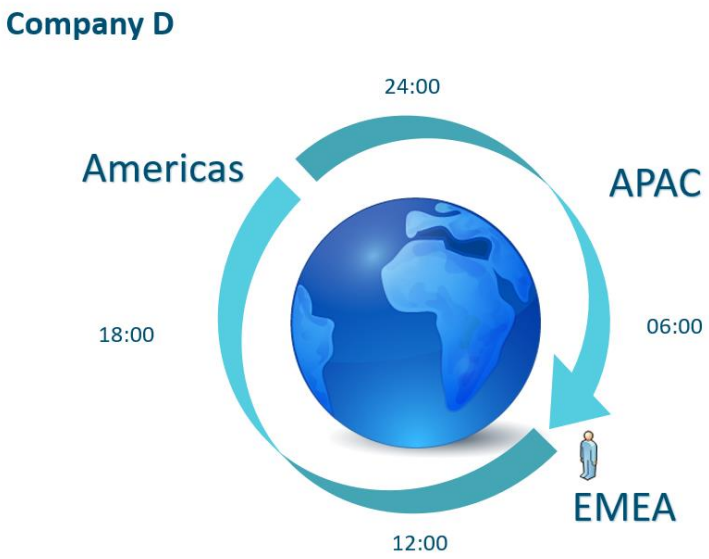

Figure 5. Illustration of Company D's application support coverage

The advantages of the model include good coverage and clear process with very little communication problems due to the one-member-model. The one-member-model also poses a challenge as this model is very heavy on one person. The person on-duty gets of course compensation for the shift, but at the same time the model is not available to everyone such as workers with families.

4.5 Conclusions about the Case Studies

All interviewed companies have a service desk or a single point of contact for the service requests. All interviewed companies also aim at 24-hour application support coverage, some also reaching full coverage. The ways to achieve the coverage depend on the size of the company: the amount of customers and their support requests play an important role. None of the interviewed companies have outsourced fully the application support function. This can be because of the size of the company and because of the special nature of the software product, as company C's support manager pointed out.

24-hour coverage could also be fulfilled with insourced, centralized service desk. In the interviews, it was mentioned, that this is not a realistic option as the costs would be too high. Effectively in these case studies, the FTS model came out as the model that made most sense for the users, the company and the employees. The risks of the model were also known by the interviewed persons, and could be managed according to the answers.

The answers came from people either in a managerial position or who had already left the support work. It would have been interesting to interview also the application support team members to get their perception of their work and the models that their companies follow.

5 Case company

This chapter describes the case company (also the case study company A in Chapter 4). It has a clear service improvement need which was the starting point for this report. This chapter describes the company briefly as a whole. A closer look is then taken at the support team and its tasks. After that, the software of the company is looked at from the point-of-view of its daily operations' cycle. Finally, current international aspirations and the relevance of recent merger to the support function are discussed. The following description is based on my own knowledge after working in the company's support team for 2 years, 1,5 years of which as the team lead.

5.1 Overview of the Company

The company in question is a Helsinki based Finnish company, that has been in supply chain management (SCM) business for 11 years. Its software product is an integrated supply chain planning solution. The business model is in most cases Software as a Service (SaaS) with some on-premise installations implemented and supported.

The company's SCM solution has been sold to other markets outside Finland: Sweden, Norway, Denmark, Germany, Great Britain, South Africa, Italy, Spain, France and the USA. The solution has at the moment users is almost 20 countries over many time zones and cultures. The company has presence *i.e.* offices with sales and project management personnel in all markets where its solution is used. Because of this, providing software support to the customers as well as support for technical implementation teams in various time zones has grown to be an issue. Figure 6 shows company presence and application users on a business region based world map.

Figure 6. Company presence and application users on business region based world map

5.2 Support Team

The support team of the company performs various application support tasks. It is made of altogether 15+ people with full-time and part-time employees meaning the head-count varies from day-to-day. The software, i.e. the company's solution, is an enterprise product with specific modules and case-by-case tailoring for different use cases. The support team gives application support to company's own software, and also internal support related to any other application used by the company such as Capistrano and Git. The application support provided to customers is B2B support with centralized service desk, which employs 6 – 15 people on a daily basis. The support team is sitting in Helsinki and working from 8:00 am to 5:00 pm (UTC+2:00). The working day per person is 8 hours. Nine hours of support time are covered with flextime.

As stated, the support team's tasks are not solely application support tasks. The work of the support team can be described as twofold: there is **application support** and **infrastructural project support**. The application support can be further divided into technical support and business support.

Application support means in the company's context support given to application installations where the project phase is over, so the implementation is completely ready. Technical application support consists of the monitoring of installations and receiving and solving customers' service requests. Customers' service requests are divided by

technical support team into two categories: technical requests and business logic requests. The technical support team responds to the technical issues and a separate unit, business support team, responds to business logic related inquiries.

Infrastructural support means the support given to projects by installing environments and file transfer accounts as well as monitoring of servers regarding disk space and memory usage. Transferring software installations from one server to another also falls to this category. There is also a variety of small support tasks performed in the infrastructural support. Infrastructural support works mainly on tickets in a different ticketing system than application support. In short, the tasks are quite different from application support.

The support team has thus roles in technical support, business support and infra support. The infra support operates inside the technical support taking resources from technical application support but also providing valuable support to company's own workers and giving nice change to the employees of the technical support team. Also, the role of business support is subject to internal needs: business support assists also in internal business logic questions and business support knowledge is needed in analyzing cases, which means that the people doing business support can get requests to do extensive analysis work, which again takes resources from application support.

All monitoring issues and service requests are processed through a tracking system. Currently, service level agreement (SLA) targets are applied to service request tickets, as the urgency of human sent requests has been considered the highest.

5.3 Rotation of the Software

The software of the company is an integrated solution. For the system to have updated data, the application gets data from customer's enterprise resource planning (ERP) system on regular basis, most commonly once a day. The integration can mean file transfer or database queries to customer's ERP. After receiving updates, application processes these into its own database and performs calculations and various optimizations defined separately for each customer in the application. The updating and calculations are performed during night time leaving the day time to application users to

utilize the system – calculations can be very resource heavy making using application simultaneously less optimal.

During a 24-hour-period the system is performing three kinds of tasks: it is updating itself and running calculations; it is functioning as a user interface to the database; it is performing maintenance and backup procedures. These phases are not parallel but follow each other: the user interface functionality is generally needed during users' working hours and is very strongly connected to the time zone of the client.

This three-part daily cycle can be titled *system rotation*. Observing the rotation reveals its relevance to arranging support services: the need for incident management is constant as the system is running around the clock, but the urgency level and emphasis on monitoring versus service requests varies.

In Figure 7, system rotation is illustrated. In this illustration, application support is available during the same time as the client is using the user interface. Prior to this phase, there is the "nightly run phase" meaning the updating and runs. The third phase is titled quiet time due to the users and runs being absent from it, but this phase is commonly used for background jobs such as backups.

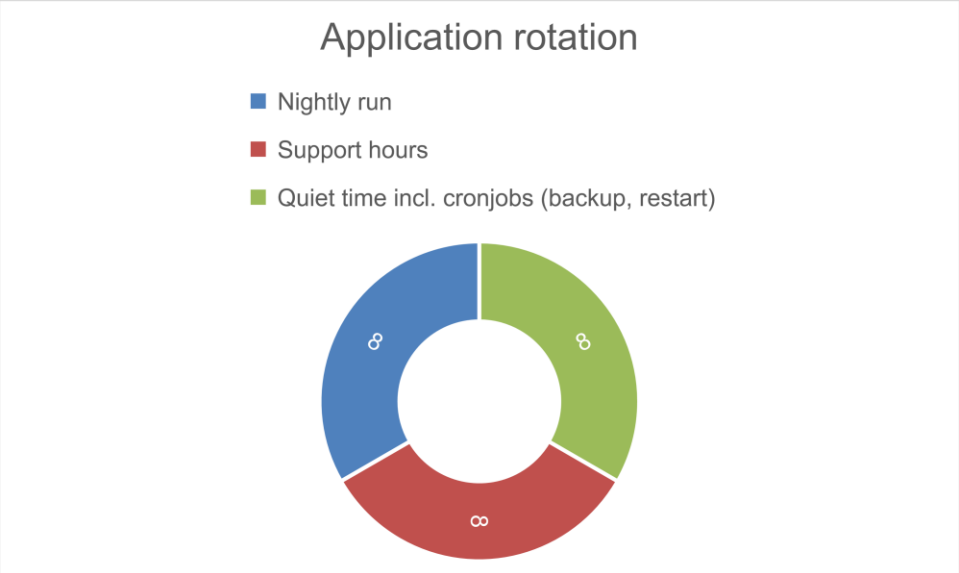

Figure 7. Application's daily rotation

This rotation contributes naturally to the way support needs to be organized. Currently, the nightly runs take place without human monitoring or immediate support. Any issues in the nightly runs are detected only after 8:00 UTC+2:00. As most application users also work from the morning hours onwards processing daily orders, any disturbances in the nightly run mean effectively reductions to effective work time leading potentially to customer dis-satisfaction. In order to give the best possible support, there should be support staff available also during the nightly run phase of the rotation. Also, support should be able to proactively solve file transfer issues which is now usually not the case – support can now merely inform customer side that file transfer has failed.

The so-called *quiet time* is the part where no critical runs or usage are taking place. Backups and daily restarts are however critical and could also benefit from monitoring. The most prominent advantage of having support available during this hour, is the ability to do version and server updates without disturbing the usage or runs. Updates and careful monitoring of the system afterwards could this way get a much-needed time slot. Effectively this means tasks of infrastructural support. Also, users support requests could be continued during this time so that the solution could be ready by the time they get back to work the next day.

The rotation model shows how having support constantly available would benefit the application setup. In addition to this, application users reside in various time zones. The time of “needed support hours” varies thus, and this of course presents the challenge discussed in this report. It is very simple to see that users in Great Britain or the USA cannot get the same service level as users in Finland or Sweden because working hours and time zone add a challenge.

An sdditional challenge to the international customer base is the cultural aspect which consists of language and any cultural norms and sensitivities. These challenges have previously been solved by having multi-lingual support team members and having the project team stretching their efforts to cover also the continuous service mode. In the future, the need for multi-lingual support team members prevails. With the development of the support model, the project team should be able to leave support work as such and continue to only be part of the collaborative solving of complex requests.

5.4 Merger and its Consequences to the Support Development Task at Hand

In spring 2016, the company acquired a UK based company that provides a solution in planning, automation and optimization of assortment and space planning to the retail industry (Press release 7.6.2016). This company's headquarters are in Stoke, England, from where the user support is also given (see Case study B). One application support team member works as outsourced from Hong Kong providing support to a customer there.

The merger is not the kind where functions are melted into one. There are, however, now more people in support team and additional support location to consider, namely Hong Kong. The softwares of the companies are highly different and the respective supports cannot merge into one without a clear agenda to do so. This agenda has not been clarified and at this moment, there will likely be co-operation but no merging of support teams. For the purposes of this report, it is however important to note the possibilities Hong Kong presence offers.

5.5 Conclusions of this Chapter

The company for which the support development is to be designed, has a global presence in the form of many offices around Europe and one in USA. Furthermore, the company's product, a supply-chain management software, has users in even more countries and time zones. The software support is currently a mix of application support and internal technical support. This gives a variety to the tasks but also reserves resources from customer's application support requests.

Currently, the software is supported with a centralized service desk with some characteristics of a local service desk even. The support team resides in Helsinki, in time zone UTC +2, and works 8-hour-shifts. Additionally, there is a duck-tape-solution to support the U.S. office by having one person doing an evening shift from the Helsinki office, as mentioned in Chapter 4.

It is clear, that this support model is not sustainable even in the current setting and current customers. In the near future, the U.S. markets will get even more customers and there is even sales pipeline to Asia. Having said that, even without the presence of

Asia-based customers, support work during APAC hours can be seen as a valid solution when reflecting upon the rotation of the software. There is activity during night time, which is not monitored in real-time. The benefits of having support present during the night-hours of EMEA include better customer experience and faster response times.

6 Results of this study – A recommendation

This chapter takes the theoretical foundation set in chapters 1 and 2, and the real-life based observations in chapters 3 and 4, and formulates from them a clear recommendation for developing the continuous service to suit the needs of an internationally expanding supply-chain company. This chapter looks at the most profound questions regarding development task and proposes answers to those.

The points considered in the recommendations are

- customer needs
- employee's work-life balance; and
- 24-hour coverage.

It is noteworthy that costs are not considered here. This is not because the costs are not relevant, but because this report aims at finding the best model. Also, this report is not going to propose a complete change but aims at developing the current setup. As described in Chapter 4, there is already a global presence, but the support team is so far not global.

6.1 Model

Considering the global aspirations, choosing the model of service desk is simple: the service desk should be virtual. There should be a possibility to access the service desk from anywhere in the world and at any time. This needs to be true for both the support staff and the customers. Furthermore, the service desk should be such that it enables sharing knowledge about the customers and their previous cases. The challenges and risks in the virtual service desk are in the uniformity of processes

A virtual service desk also enables the use of the operation model Follow-the-sun, which is the operation model this study recommends in the case at hand. The FTS model is the most appealing model to choose because it is an answer to all three main consideration points of this chapter: customer's service needs are fulfilled, employees get a work-life-balance with no shift work, and 24-hour coverage is achieved. As there

are customers, users and colleagues all around the world, there needs to be support available at all times. Another way of achieving this would be to utilize shift-work, but as this report does not want to overlook the implications such arrangements have on personnel's life, that model cannot be recommended here.

The challenge is at the moment in the recruiting, training and creating a process to flow through the geographically separated team members. Recruiting needs to address the need for multi-lingual, technologically oriented employees with a positive attitude to relocating for some time *i.e.* from Finland to Atlanta or Hong Kong after a training period, or from Hong Kong or Atlanta to Finland for a training period. There is a need for training to ensure the follow-the-sun process is familiar to everyone. And finally, processes for handovers and other FTS specific tasks need to be created and agreed upon.

To make FTS successful, prioritizing of tickets needs to get attention as handovers will be based on criticality assessment. This report suggests a process where the APAC, EMEA and Americas teams have a team lead who will be responsible for the handovers and the prioritizing.

As research has shown, there will be challenges in the communication, sharing of knowledge and coordination. All these need to be prepared for by training, by enforcing documentation and by creating a team spirit which allows for all types of questions and communication. On the practical side, the tracking system needs to support FTS. Also, SLAs need to take FTS into consideration.

6.2 Resourcing

Regarding the question of insourcing versus outsourcing, there are more factors that speak for insourcing than outsourcing. The software that is being supported is complex enterprise application with customized specifications. There is no need for simple application support tasks such as changing passwords. In other words, there is no clear section of the service that could be outsourced.

Furthermore, the B2B application support function is part of continuous service. The outsourcing part of it would translate into application support not being a vital part of the company, and in a B2B setting this would be wrong. This study finds that it is vital to

keep the application support customer service in-house in order to provide best value to the customers and to keep better track of customer relations.

There is however one sector where outsourcing of partial outsourcing could come to question: there are currently users but no customer presence in the APAC business region. Initially, it could be possible to outsource this time zone's support hours as was also done in company C's case with a co-sourcing model. This study does however not recommend outsourcing even for the APAC region but sees a development of the current model into including APAC regions as the better model and a solution for the longer term. One reason behind this recommendation is the presence in Hong Kong which should be utilized.

6.3 Locations

There is already company presence in Europe and USA, which means two out of three locations on the three business operation regions are already clear. The headquarters are in Helsinki, Finland, UTC+2:00, where also product development takes place and knowledge of the software is deepest. In Atlanta, USA, UTC-5:00, there is a newly opened office with also technical staff. These locations are a natural choice for support team's locations.

Figure 8. Recommended locations of support teams

Through the recent merger, there is now also presence in Hong Kong, UTC+8:00. This report recommends using that location as the third spot, as shown in Figure 8, because of practical reasons: application support is already provided from there on group level and the time difference is close to optimal.

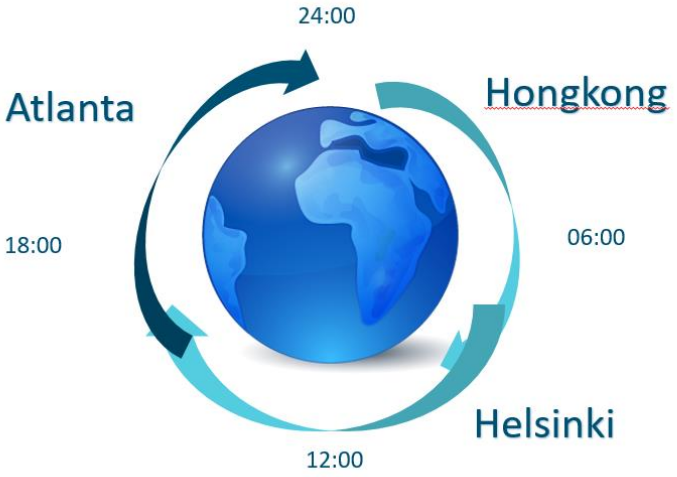

Figure 9. Result of having three teams in business regions: Helsinki UTC+2, Atlanta UTC -5, Hong Kong UTC +8

Figure 10 illustrates a scenario where the working shifts overlap between Hong Kong - Helsinki by three hours and Helsinki-Atlanta by two hours. There is also a gap of two hours between when Atlanta closes and Hong Kong starts. In practice, this should be a manageable situation.

UTC	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	0	1	2
Helsinki	0	0	0	5	6	6	6	6	6	6	6	5	0	0	0	0	0	0	0	0	0	0	0	0
Atlanta	0	0	0	0	0	0	0	0	0	0	2	3	3	3	3	3	3	3	2	0	0	0	0	0
Hong Kong	2	2	2	2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2

Figure 10. Illustration of work hours overlapping, includes planned employee amounts

The distribution of the support team to various locations should ideally be based on the number of tickets. Drawing from application support's ticketing system, there is a peak at around 6.00 UTC+0:00, as shown in Figure 11. The reason for this peak is naturally that traditionally support starts to work at that time, and so automatic monitoring runs

scheduled alarms at that time. Also, many European customers start working at that time.

Figure 11. An example day: peak in ticket number starts to build after 6:00 UTC+2:00 and grows until 8:00 UTC+2:00

It can be assumed that Helsinki would have the greatest number of team members. Atlanta office would need 2 – 4 team members and Hong Kong 1 – 3, to begin with.

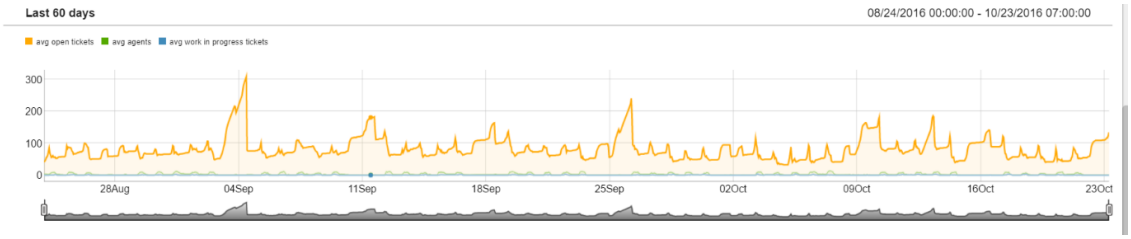

Figure 12. The clear peaks in ticket numbers are visible in the chart with 60 days of tickets

Based on the preliminary numbers of staff and how the time-zones overlap, the situation would look something like Figure 13 describes. There will be high numbers of application support team members present at 6:00 – 9:00 UTC and again 13:00 – 15:00 UTC. The first peak in team members would then correspond to the peak hours in ticket numbers. Also, the second peak in team member numbers is well motivated as that is the time to start solving the U.S. customers' ERP interface issues.

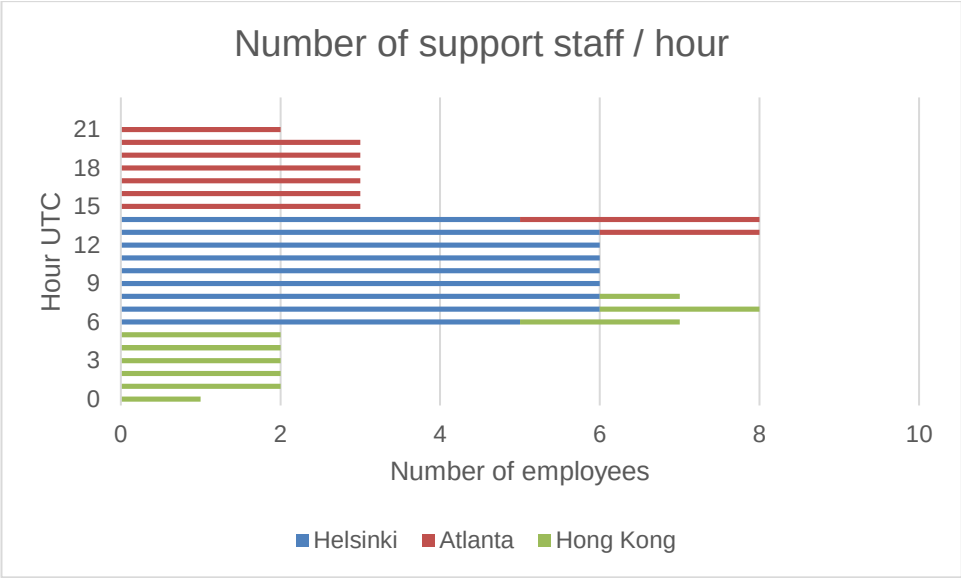

Figure 13. Staffing in FTS

As stated, the locations in the above are not *quite* optimal. Even the time difference between Helsinki and Atlanta is not optimal for the FTS application support setting. Helsinki, being the headquarters and the home of development, *i.e.* with the deepest software knowledge, should work as the starting point for optimizing the other two teams' locations.

Optimally, the teams would sit 8-hours-apart:

- EMEA, UTC +2
- Americas, UTC -6
- APAC, UTC +10

Actual cities or countries could then be Helsinki, Finland; Dallas, USA; and Brisbane, Australia (or Sydney, Australia, which however uses daylight savings time).

6.4 Weekends

This report has addressed the development towards 24-hour coverage. What is left outside of this report are the weekends. It is not entirely certain what the future need will be for weekend support from the customer perspective. It is however safe to assume that the supply-chain solution needs to be functional even during weekends especially for large retailers. Organizing of weekend support should follow the FTS model and is a question of staffing. Currently there is contractual Sunday support available.

6.5 Conclusions of this Chapter

This report recommends that the case company develops its application support towards 24-hour coverage. Support functionalities should be examined to judge which ones to cover in the 24-hour regime. This report further recommends that the company implements the best available virtual service desk with insourced support staff. In this way, 24-hour coverage can be achieved and the quality of support is ensured as well as the control over it retained. To get the full daily coverage, support needs to be given from a minimum of three locations: Helsinki, Atlanta and Hong Kong. Effectively, the company should implement the follow-the-sun operations model with handovers at the shift change.

7 Final Conclusion

The aim of this report was to make an informed recommendation to a real-life company on how they should develop their application support. The challenge the company is facing is that of international growth. There was not much direct, recent academic research on the topic but gathering information from software development team's similar challenges and from much-researched outsourcing, this report could formulate a framework upon which the recommendation could be made.

The framework was used for choosing the best suited model and choosing the most fitting service sourcing. This study wanted to stress the people perspective, both customer and employee, since a modern IT company, such as the case company here, cannot overlook the human factors if it wants to be successful. The costs of the models and sourcing were not addressed in this study.

As the challenge of international setting for a support team is not new, this report wanted to approach the question also by examining ways which other companies of similar business operations, customers or sizes have used to solve the challenge. The case studies are by no means comprehensive and do lack some very common solutions such as full outsourcing. The companies interviewed were however not selected to present as many types as possible. The reasoning was more in being able to analyze some real-life cases in the framework set in the theoretical part.

In exploring the current situation of the company, this study was able to point out the shortcomings. The support team has many tasks and many sub-divisions in the form of technical support, business support and infra support. The development issues of the support team are however geographical, *i.e.* time zone and distance related. Thus, this report proposes a geographical solution: the FTS model. There should be still discussion on whether the whole support team should follow the FTS operations model. It is clear, that the technical support providing the first-line application support, must follow FTS. Also, business support is needed in the FTS model at least in the operational business regions, where there are users present. Regarding the infra support, there is clear advantage in FTS as some infra support tasks should preferably be done outside software user's working hours.

For the next step, this report recommends that the company should apply ITIL's best practices for Continual Service Improvement (CSI) and formulate a Service Improvement Programme (SIP). The programme should include detailed action points for recruiting and training of support staff, as well as action points for adapting new working methods to support FTS such as prioritizing and handover processes.

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